"So, how's it going?" Whether you hear it in the hallway or in your regularly scheduled project review meeting, you have stakeholders who want to know the latest news on your project. There are usually a variety of topics they want to hear about, but there are two questions that are always asked: "Will it be on time?" "Will it be on budget?"

There is another question they all have, but may not be asking: *"Do you really know how it's going?"*

This article is fifth in the series on proven project management techniques. It will present a long-used method of project accounting known as earned value analysis. By using this approach, a project manager, sponsor or customer can make more objective, accurate assessments of project progress.

Why is this so important? Because many project managers don't really know the true cost and schedule performance until the project is almost over. For most of the project it can "feel" as if things are on track, and team members can be upbeat about meeting their individual deadlines. But relying on the feelings of the project manager or team can lead to disaster because as human beings our "gut feelings" are subject to many variables. That's why your management and customer may be wondering if you really know the truth about your project's cost and schedule status.

Now don't get defensive. Put yourself in their shoes for a moment. Let's take a simple example to see how this looks from a customer or owner standpoint. Imagine that you have a lot of work to do to make your backyard beautiful, and you are just too busy with work and family to do it yourself. So after laying out your design and obtaining bids, you engage a reputable landscaping firm.

The work consists of putting in a new lawn, pouring a concrete patio and building some raised beds for your garden. The bid was broken down in this way.

Lawn:	$4,000
Raised beds:	$4,000
Patio:	$4,000

The work is scheduled to be completed in six weeks, and you have agreed to progress payments of $2,000 per week. After two weeks a lot of dirt has been moved around and lumber has been delivered. The landscaper asks for a second $2,000 payment. You are nervous about the actual progress, but the landscaper assures you that things are going well, and that moving the dirt will enable progress on the lawn, patio and beds the next week. The lumber will be used to build forms and make the raised beds. "Oh yes, the work is easily one-third completed."

The bid of $12,000 had seemed to be reasonable. Breaking down the job into the primary products made it easy to understand and to compare this bid with other bids. But one-third of the way through the budget and schedule, all you have is a hollow feeling in the pit of your stomach. What could have been done differently to give you more confidence that the project is one-third of the way complete?

The answer is a technique known as earned value analysis (also called EVMS for earned value management systems). Earned value has been used for decades by project owners to ensure that progress payments have been earned — thus the name earned value analysis.

An Earned Value Example

The best way to understand earned value is with a simple example. So let's return to our landscaping problem. The problem we face on this project is our concern that we aren't getting our money's worth for our progress payments. We don't want to find out at the end of six weeks and six payments that the job still isn't done. A detailed work breakdown structure (WBS) and schedule will help us solve the problem.

Step One: Begin with a Detailed Plan

A work breakdown structure decomposes an entire project into a list of tasks. Figure 1 shows 10 tasks for our landscape example. (Note that these are finite tasks, each with a beginning and end.) Further, once the landscaper has created this WBS we can assign specific costs to each task. These estimated costs are seen under the "Planned" column. Notice in the table that there is also a schedule associated with the tasks. This detailed plan will be our basis for gauging the performance of our landscaper.

Step Two: Capture the Actual Progress during the Project

The landscaper has asked for weekly progress payments, so it makes sense that we can ask for weekly progress reports. The example in Figure 1 shows the actual costs incurred and progress after the first two weeks of the project. The columns labeled "Actual" show the actual cost of labor and materials for work completed so far.

Step Three: Calculate Progress

On a small landscape project you can see physical evidence of progress and intuitively know the answer to "How is it going?" when you see the planned and actual costs. But on larger projects (the kind your customer is worrying about) physical evidence is not always readily apparent and intuition is a poor substitute for measuring progress. That's where earned value calculations provide a better understanding of both cost and schedule progress. Using our example, we will first assess our cost performance, and then analyze the schedule progress.

The terms and formulas listed below have been in use for decades and are in the public domain. There are many sources for more information on these formulas, including most project management text books. It should also be noted that the Project Management Institute has suggested revising some of this terminology, but in this article we will use the terms endorsed by the National Defense Industry Association or NDIA.

Assess Cost Performance

Are we on track to spend more or less than our budget? The following terms and formulas will help us answer that question.

Budgeted Cost of Work Performed (BCWP): The amount we had planned to spend on the work that has been accomplished to date. In our example, after two weeks we have accomplished tasks 1, 2, 4, 6, 9 and 10. The original estimate for those tasks was $8,000. So the BCWP at two weeks into the project is $8,000. This is also known as the earned value, in other words, *"What value has been earned so far?"*

	Task Name	Labor & Material Cost		Weeks					
		Planned	Actual	1	2	3	4	5	6
	Put in Lawn								
1	Grade site	$1,000	$1,100						
2	Spread topsoil	$1,000	$1,000						
3	Seed lawn	$1,000							
	Build Raised Beds								
4	Level base	$1,000	$1,000						
5	Construct beds	$1,000							
	Build the Patio								
6	Level the site	$1,000	$1,100						
7	Build forms	$1,000							
8	Pour patio	$1,000							
	Purchase Materials								
9	Lumber Delivered	$2,000	$2,000						
10	Topsoil Delivered	$2,000	$2,000						

Figure 1.

Actual Cost of Work Performed (ACWP): The amount we have actually spent. The progress reports show the landscaper has spent a total of $8,200 to date.

Cost Variance (CV): The difference between what we planned to spend and what we have actually spent on the work that has been performed so far. CV = BCWP - ACWP. Example: CV = $8,000 - $8,200.

Cost Variance Percent (CV%): This calculates the percent over or under your budget the project is to date. Divide the Cost Variance by the Budgeted Cost of Work Performed. (CV% = CV/BCWP). If this figure is negative, it is bad news – the project is overbudget. In this example, the project is 2.5 percent overbudget. Example: CV% = -200/8,000.

Analyze Schedule Progress

Obtaining an accurate understanding of schedule progress has traditionally been even more difficult than assessing cost performance. For instance, if a project is behind schedule, we want to know how far behind. If a project has one task behind by one week that is clearly better than having five tasks behind by one week, but how do we accurately communicate that to our stakeholders? The formulas below allow us to use cost to accurately measure schedule progress.

Budgeted Cost of Work Performed (BCWP): We used this in our cost analysis above. It is the amount we expected to spend on the work that has been accomplished to date.

Budgeted Cost of Work Scheduled (BCWS): This is the amount we expected to spend to date. In the example, the original schedule called for accomplishment of tasks 1, 4, 6, 9 and 10 within the first two weeks. The budgeted (planned) cost of that work was $7,000.

Schedule Variance (SV): Here's where we measure schedule progress with dollars. Subtracting BCWS from BCWP shows whether you've accomplished more or less to date than what you had expected. SV = BCWP - BCWS. If the amount is negative, you are behind schedule. (As with the cost analysis, whenever the variance produces a negative number that is bad news.) Example: SV = 8000 - 7000.

Schedule Variance Percent (SV%): How far ahead or behind schedule are you? SV% = SV/BCWS. According to this calculation our landscaper is 14 percent ahead of schedule. Example: SV% = 1000/7000.

Other Calculations

By using these basic formulas it is possible to re-forecast the project completion date and the actual cost of the project. The source at the end of this article provides additional formulas that provide different insights on the project.

Advantages of Earned Value Analysis

Why do we need this special form of project accounting? As the example shows, these calculations enable project managers and owners a much more accurate view of project performance while it is still early in the project. That is important because it is only BEFORE the money is spent that we have an opportunity to change our approach to the project. Here are two other advantages:

• Cost performance is not a cash flow comparison. Understanding a project's cash flow does matter, but it does not often provide an accurate understanding of cost performance. Comparing the amount of money expected to be spent during the first three months of a project to the money actually spent isn't meaningful if the project is either behind or ahead of schedule.

• Schedule analysis recognizes ahead of schedule performance. On projects with many concurrent activities some tasks are

performed well ahead of schedule, even as others are performed late. The larger the project, the more likely this will happen (and the more difficult it is to accurately understand schedule status). By comparing the total value of work accomplished (BCWP) with the value we had expected to achieve to date (BCWS) we can see whether the overall project is ahead or behind.

The Most Common Earned Value Mistakes

We have used a simple example to demonstrate earned value analysis. Putting it to work on larger projects is obviously going to be a little trickier, and you need to be aware of two common mistakes that have tripped up many organizations in the past. Both mistakes are derived from the way the WBS is structured.

The right way to structure the WBS is to make each task finite with a specific, measurable outcome. This way a task can be started and completed. Sounds simple, right?

Here's the first mistake: Setting up your project with "level of effort" planning. This means rather than having discrete tasks, you just create categories, such as "design" or "engineering" and allocate a certain number of people to it over a fixed period of time. In our landscape example this would be the equivalent of just saying "labor" rather than defining specific tasks on the WBS. So the only measurement we have available is cash flow. For our landscape example it would be like the landscaper saying, "We said we would have three people working for six weeks, and so far we have had three people working for the first two weeks. So we are on budget and it's anybody's guess about schedule."

The second mistake is having tasks on the WBS that are so large in scope that we can only guess partial completion from week to week. This typically happens on a large project where tasks aren't broken down far enough. If we report progress on a weekly basis, but people are working on tasks that are many weeks long, then at each status meeting they are really only guessing their progress. That's the same problem that we started with. When tracking schedule status the only thing that we really know is whether the task is started and whether it is completed. In between those two points we are just guessing.

"So how's it going?"

Using earned value analysis we see that the landscaper is sufficiently on target to justify progress payments. Whether you have a cost-plus contract or a fixed price, whether your customer is in-house or external, the analysis we have performed provides an accurate view of progress for both cost and schedule.

Accurate project status will not ensure projects are on time or on budget, but you will get an earlier warning when you have a problem. That can mean more time to solve the problem and probably more options for solving it. Finally when you are asked, *"How is it going?",* you will have credible answers for a confident response.

Source

Verzuh, Eric. *The Portable MBA in Project Management*. New York: John Wiley & Sons, 2003. (pp. 162-167)

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DON CIO Chairs DoD Identity Management Senior Coordinating Group

Mr. Dave Wennergren, DON CIO, was recently named Chair of the new Department of Defense (DoD) Identity Management Senior Coordinating Group (IMSCG). Established by the DoD CIO in January 2004, the IMSCG provides senior oversight and coordination of DoD's biometric, smart card and PKI initiatives.

The IMSCG replaces three bodies: the Smart Card Senior Coordinating Group, the PKI Senior Steering Committee, and the Biometric Senior Coordinating Group. This consolidation produces a single forum that will streamline and integrate the management of DoD/DON biometric, smart card and PKI initiatives.

The IMSCG responds to the need within the Department of Defense to globally oversee and combine efforts of these important initiatives aimed at managing the identity of DoD employees and networked devices by improving the security of DoD's systems. The senior coordinating group will craft and monitor the Department's vision and strategy for utilizing identity management capabilities to enhance readiness, improve business processes and ensure necessary security.

Mr. John Stenbit, Assistant Secretary of Defense, asked Mr. Wennergren to chair this coordinating group based on the tremendous success of the Smart Card Senior Coordinating Group, which oversaw the roll out of over 4 million Common Access Cards throughout DoD. Mr. Wennergren has chaired the Smart Card Senior Coordinating Group since its inception four years ago.

The IMSCG consists of Flag/General Officer and SES representatives of each of the Armed Forces, OSD Principal Staff Assistants, National Security Agency (NSA), Defense Information Systems Agency (DISA), Defense Manpower Data Center (DMDC) and others. It is a cohesive DoD-wide policy, requirements, strategy and oversight group for managing the physical and virtual identities of all DoD personnel, support contractors and devices.

The IMSCG will focus on Department-wide interoperability standards, performance metrics, and ways to leverage identity management tools to enhance readiness, improve business processes and increase security. The group will receive support from the DoD Biometric Management Office, DoD Access Card Office and DoD PKI Program Management Office for their respective focus areas.